

## CLAIMS

1. A small-diameter coaxial cable comprising a central conductor, an insulated covering layer arranged on the outer  
5 periphery of the central conductor and having air gaps continuous along the longitudinal direction, and an outer conductor layer arranged on the outer periphery of the insulated covering layer;

characterized in that the insulated covering layer includes an inner annular portion covering the outer periphery of the central  
10 conductor, a plurality of coupling portions extending outward from the inner annular portion and an outer annular portion connecting the outer peripheral edges of the coupling portions to each other, the coupling portions defining the peripheral direction of the air gaps.

15 2. A small-diameter coaxial cable as described in claim 1, characterized in that the inner annular portion and the coupling portions combined with the outer annular portion, the inner annular portion combined with the coupling portions and the outer annular portion, or the outer annular portion is formed in two layers of  
20 different types of resin.

3. A small-diameter coaxial cable as described in claim 1 or 2, characterized in that the outer annular portion is formed of a resin capable of being plated with a metal, and the outer conductor  
25 layer is formed by plating a metal.

4. A small-diameter coaxial cable comprising a central conductor, an insulated covering layer arranged on the outer periphery of the central conductor and having air gaps continuous along the longitudinal direction, and an outer conductor layer

arranged on the outer periphery of the insulated covering layer;

characterized in that the insulated covering layer includes an annular portion covering the outer periphery of the central conductor, one or more columnar portions (ribs) extending outward  
5 from the annular portion, the outer conductor layer is arranged to be in contact with the outer periphery of the columnar portions, and one or more air gaps continuous along the longitudinal direction are formed on the inner side of the outer conductor layer.

10           5. A small-diameter coaxial cable as described in claim 4, characterized in that the outer conductor layer is formed of a hollow compressed stranded wire.

15           6. A small-diameter coaxial cable as described in claim 4, characterized in that the outer conductor layer is formed by winding the outer periphery of the columnar portions with a metal tape or a metal foil of superior electrical conductivity such as copper or a metal laminate film including the metal tape or the metal foil laminated with a plastic film.

20           7. A small-diameter coaxial cable as described in claim 4, characterized in that the outer conductor layer is formed of a metal pipe superior in electrical conductivity such as copper, and a semi-finished product (insulated core) formed with a covering layer  
25 having the columnar portions is inserted into the metal pipe while drawing and extending the metal pipe through a die.

          8. A small-diameter coaxial cable as described in any one of claims 1, 2 and 4, characterized in that a plurality of the coupling  
30 portions and a plurality of the columnar portions are extended

radially at equal angular intervals in the cross section while at the same time being extended along the longitudinal axial direction of the small-diameter coaxial cable with the same intervals.

5           9. A small-diameter coaxial cable as described in any one of claims 1, 2 and 4, characterized in that the coupling portions and the columnar portions are formed spirally along the longitudinal direction.

10           10. A small-diameter coaxial cable as described in any one of claims 1, 2 and 4, characterized in that the annular portion, the coupling portions and the columnar portions are formed by extruding fluoro resin such as FEP, PFA or PTFE or synthetic resin such as APO (amorphous polyolefin) or PEN (polyethylene  
15 naphthalate).

          11. A small-diameter coaxial cable as described in any one of claims 1 to 10, characterized in that the insulated covering layer occupies not less than 10 % of the area of the air gaps in the cross  
20 section.

          12. A small-diameter coaxial cable as described in any one of claims 1 to 11, characterized in that a protective covering layer is formed on the outer periphery of the outer conductor layer.  
25

          13. A method of fabricating a small-diameter coaxial cable, characterized in that:

          a covering die including a central hole for insertion of the central conductor therethrough and a resin discharge portion having  
30 a circular annular portion formed on the outer periphery of the

central hole and a plurality of radial slits extending radially outward from the outer periphery of the circular annular portion is used in such a manner that the central conductor is inserted through the central hole while at the same time molding by  
5 extruding the melted thermoplastic resin, with a draft, from the resin discharge portion thereby to obtain an intermediate molded component including an inner annular portion covering the outer periphery of the central conductor and a plurality of coupling portions extending outward from the inner annular portion and  
10 similar in shape to the die,

after which the intermediate molded component is introduced to the head of a melt extruder, and the outer annular portion is covered by extrusion on the coupling portions by an annular covering die thereby to form the insulated covering layer having the  
15 air gaps,

after which the outer conductor layer and the protective covering layer are sequentially formed on the outer periphery of the insulated covering layer.

20 14. A method of fabricating a small-diameter coaxial cable, characterized in that:

the central conductor is covered by extrusion with the thermoplastic resin melted in annular fashion, with a draft, by an annular covering die thereby to obtain an intermediate molded  
25 component having an inner annular portion covering the outer periphery of the central conductor,

after which using a die including a central hole, an annular portion and a resin discharge portion having a plurality of radial holes extending radially from the inner periphery of the annular  
30 portion, the intermediate molded component is inserted through the

central hole while extruding the melted thermoplastic resin from the resin discharge portion with a draft thereby to form an outer annular portion and a plurality of coupling portions extending to the center, thereby forming the insulated covering layer having the  
5 air gaps,

after which the outer conductor layer and the protective covering layer are sequentially formed and covered on the outer periphery of the insulated covering layer.

10 15. A method of fabricating a small-diameter coaxial cable as described in claim 14, characterized in that in place of the process of obtaining the intermediate molded component,

a dispersion in which the thermoplastic resin particles is dispersed in a dispersion medium (liquid) is coated or impregnated  
15 around the central conductor, after which the dispersion medium is evaporated thereby to form an annular covering on the central conductor or an annular covering is formed by powder coating thereby to form the inner annular portion and obtain an intermediate molded component having the inner annular portion  
20 covering the outer periphery of the central conductor.

16. A method of fabricating a small-diameter coaxial cable comprising a central conductor, an insulated covering layer arranged on the outer periphery of the central conductor and having  
25 air gaps continuous along the longitudinal direction, an outer conductor layer arranged on the outer periphery of the insulated covering layer and a protective covering layer arranged on the outer periphery of the outer conductor layer, characterized in that:

using a die having a central hole for inserting the central  
30 conductor therethrough and a plurality of T-shaped split holes

arranged adjacently to each other on the outer periphery of the central hole, the central conductor is inserted through the central hole while at the same time extruding the melted resin from the central hole and the T-shaped split holes thereby to form the insulated covering layer having the air gaps continuous along the longitudinal direction on the outer periphery of the central conductor,

after which the outer conductor layer and the protective covering layer are sequentially formed and covered on the outer periphery of the insulated covering layer.

17. A method of fabricating a small-diameter coaxial cable as described in any one of claims 13 to 16, characterized in that the outer conductor layer is formed by plating a metal.

18. A method of fabricating a small-diameter coaxial cable, characterized in that a covering die including a central hole for inserting the central conductor therethrough and a resin discharge portion having an annular portion and a plurality of radial slits extending radially outward from the outer periphery of the annular portion is used in such a manner that the central conductor is inserted through the central hole while at the same time molding by extrusion, with a draft, the melted thermoplastic resin from the resin discharge portion thereby to obtain an intermediate molded component (insulated core) similar in shape to the die and having an inner annular portion covering the outer periphery of the central conductor and a plurality of coupling portions extending outward from the inner annular portion, which intermediate molded component is supplied continuously so that an outer conductor layer is formed by covering a hollow compressed stranded wire or winding

a metal foil, a laminate film or the like or covering by extending a copper pipe on the outer periphery of the columnar portions, after which an outer covering layer is formed on the outer periphery of the outer conductor layer.

5